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Trans-ASEAN Energy Network and Energy Infrastructure Security

The current global financial crisis has an impact on energy investments worldwide. However, there is room for optimism within Southeast Asia since Association of Southeast Asian Nations (ASEAN) member states remain interested in energy development. In anticipation of a revival in energy demand in a post-crisis recovery, it is important for ASEAN governments to realise that energy security is not simply about securing supplies, but also ensuring energy infrastructure security. The ongoing Trans-ASEAN Energy Network project is used as a case in point in this study.

by Collin Koh

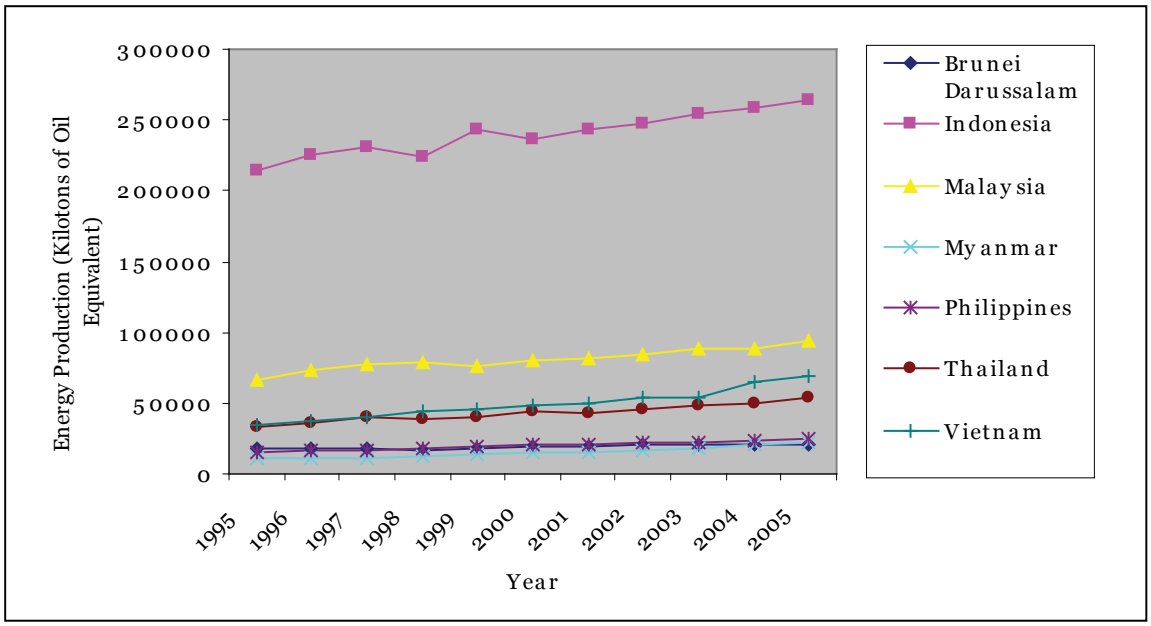
Continual 'Addiction' to Fossil Fuels

The volatility of oil prices have been the bane of energy security worldwide. More recent geopolitical upheavals, such as the 2003 invasion of Iraq, energy speculations and ardent calls for mitigating global warming, have encouraged countries to explore the use of clean energy and reduce their reliance on fossil fuels. Southeast Asia is no exception to this, having witnessed phenomenal socioeconomic development ever since the 1997-1998 Asian financial crisis. The ongoing global economic downturn presents yet another challenge to energy security, in particular putting brakes on development of alternative fuels. Fortuitously, ASEAN leaders have not dropped energy security from their minds . In fact, energy development formed part of the agenda for the ASEAN Summit scheduled in Thailand in March 2009, which was unfortunately stalled due to the latter's domestic

political turmoil.

Nevertheless, while long-term energy security certainly lies in alternative energy such as nuclear power, the reliance on fossil fuels would continue to prevail. This is especially the case for South-east Asia, where diffusion of alternative fuel technology has been slow and uneven. Hence, for the foreseeable near future, the region would continue to depend on fossil fuels to drive socioeconomic growth. This also means that ASEAN countries would continue to depend on foreign oil supplies. ASEAN has attempted to reduce its reliance on energy imports through diversification of fuels as well as increasing intra-regional energy production, as Figure 1 below shows. One such notable regional attempt has been the Trans-ASEAN Energy Network, which was first conceived in the late 1980s.

Figure 1 Energy production of ASEAN member countries, 1995-2005



Sources: Data compiled from World Development Indicators Online, World Bank 2008

Southeast Asia has traditionally enjoyed abundant natural resources including fuel sources such as coal and natural gas, even though rapid regional economic development has necessitated the import of fossil fuel supplies from the Middle East. Natural gas would appear to be a highly suitable alternative to reduce import dependency, and it constitutes the cornerstone of the Trans-ASEAN Energy Network. This regional initiative, subsumed under the ASEAN Plan of Action for Energy Cooperation (APAEC) 2004-2009, represents efforts to ensure some modicum of energy self-sufficiency.

Comprising the Trans-ASEAN Gas Pipeline and the ASEAN Power Grid, the common regional energy network appears promising from the start, enjoying strong intramural support. Despite slow progress, parts of the pipeline system have been completed. Portions of the regional power grid, such as the 115-kilovolt Thai-Laotian grid and a pair of Malaysian-Thai networks, are already operational. However, realisation of this project also means increased energy interdependency between ASEAN countries. Therefore, any disruption to the energy network could have serious transnational impact. Notwithstanding the global financial crisis, it might be imperative to explore and mitigate potential infrastructural security risks to the Trans-ASEAN Energy Network.

Potential Risks to the Trans-ASEAN Energy Network

Critical energy infrastructure comprises the production, storage, refining, processing and distribution of fossil fuels; broadly speaking this may even underpin all related infrastructure including essential services. Southeast Asia on the whole requires more than US$ 140 billion of capital investments in its critical energy infrastructure from 2006 to 2010, including US$ 88 billion for the power utilities sector alone. Among various factors, the active presence of militant groups in and geography of the region might heighten security risks to the Trans-ASEAN Energy Network.

Deliberate Physical Attacks

Numerous attacks on overland oil and gas pipelines by militants in Colombia, Iraq, and Nigeria, for instance, amplify the vulnerability of overland energy networks to deliberate physical attacks, since such systems traverse remote, mostly uninhabited areas and cover great distances, which makes monitoring and security difficult. Compared to the Middle East, intentional attacks on Southeast Asian energy infrastructure have received less attention in the Western media even though there have been disturbing indicators of regional cooperation between radical groupings in training and capacity-building. Once complete cross-border interconnectedness is achieved, the Trans-ASEAN Energy Network could be potentially threatened by these militants. A study has shown that deliberate attacks on electricity grids constituted 59 per cent of all terrorist incidents worldwide from 1994 to 2004. The resilience of energy systems is crucial despite the short-lived consequences of a deliberate attack, since risk perceptions could deter foreign investments.

Cyberspace Threats

Digitalisation is necessary for the smooth and efficient functioning of modern energy infrastructures. However, this would heighten cyberspace threats to electricity systems, especially since modern grids have become more interoperable, remotely accessible and less costly through the use of open software standards and protocols to achieve cost efficiency. Few power operators possess the resources available to track cyber security threats and some rely only on automated services provided by their distributed control systems or commercial software vendors. The United States' energy sector alone has experienced an average of 1,280 significant cyber attacks in each of the first six months of 2002. The eventual realisation of a Trans-ASEAN Energy Network, which would span vast geographical areas thus increasing network complexity and difficulty in monitoring, could potentially increase its vulnerability to malicious cyber disruptions. When combined with deliberate physical attacks, cyber attacks on the regional energy network could have adverse far-ranging, transnational effects.

Environmental Threats

The considerable damage wrought on the United States Gulf Coast energy facilities by Hurricane Katrina in 2005 illustrates the threat posed to energy infrastructures by natural disasters. Earthquakes and volcanic activity, which are regular geological occurrences encountered by countries such as Indonesia, could potentially affect the Trans-ASEAN Energy Network. The disruption to energy infrastructure as a result of natural disasters has adverse effects on essential areas vital to human well-being. For example, a 7.9-Richter Sumatran earthquake in 2000 knocked out local electricity supplies and hampered rescue efforts. Within the common energy network, the power grid components would be especially vulnerable since most of the critical equipment is exposed in surface-level facilities which could not be feasibly shielded against natural disasters.

CEIP: Assessing APAEC 2004-2009

Critical energy infrastructures worldwide are typically optimised for reliable operations in benign operating environments, and are thus susceptible to cascading failures. Generally, global energy sectors are better prepared against unintentional incidents, such as technical accidents, than deliberate threats. Whether due to man-made or natural threats, the effect on energy infrastructures would be identical. In the face of a multitude of security risks, critical energy infrastructure protection (CEIP) should comprise diversified energy systems, incorporate redundancies as well as active intelligence and monitoring systems so that disruption to any one portion might not necessarily paralyse the entire system. Being a transnational and complex energy system, the Trans-ASEAN Energy Network is highly vulnerable to disruptions by, for instance, a concerted terrorist attack or massive earthquake. Hence, a comprehensive regional CEIP strategy is essential.

ASEAN has made notable strides in regional CEIP, most notably maritime security cooperation in the Strait of Malacca between Southeast Asian littoral states. Indeed, the region's dependence on oil imported from the Middle East certainly makes such efforts necessary. The inherent vulnerability of the supply chain to geopolitical upheavals in the Middle East and maritime security threats in regional waterways, reinforced by piracy in Somali waters and the Gulf of Aden, has illuminated the importance of the Trans-ASEAN Energy Network. As discussed earlier, such regional energy development initiatives – designed to achieve the stability of energy supplies – could lead to a host of new vulnerabilities. This would necessitate evaluations and adjustments of existing CEIP agreements in order to deal effectively with new threats.

A closer look at ASEAN regional energy initiatives would show that more emphases have been placed on ensuring supply security and attaining energy efficiency than on regional frameworks addressing energy infrastructure security. Most prominent of all regional energy initiatives has been APAEC 2004-2009, which comprises:

1. ASEAN Power Grid;
2. Trans-ASEAN Gas Pipeline;
3. Energy Efficiency and Conservation;
4. New and Renewable Energy Sources, including sustainable harnessing of coal; and
5. Regional Energy Policy and Planning.

The specifications outlined for cooperation under the rubric of the Trans-ASEAN Energy Network emphasised mainly, inter alia, supply distribution, transit rights as well as jurisdiction and taxation. No provisions exist for collective arrangements on CEIP, considering the geographical, technical and financial scales of these major projects. Under APAEC 2004-2009, the project on regional energy policy and planning specified eight strategies which include supply security sharing networks and database development, energy-related dialogue with non-ASEAN partners, as well as the pursuit of studies on evolving regional energy policy issues. However, it does not contain any clause that specifies regional cooperation on energy infrastructure security.

Individual ASEAN countries could have taken national-level CEIP measures. For instance, since the 29 June 2004 power failure that affected more than 300,000 households in Singapore for more than two hours, the government decided to bolster its critical energy infrastructure by implementing measures revolving around system redundancy and diversification of fuel sources. Later in 2005, the Singapore government unveiled a three-year programme, costing US$ 24 million, to combat cyber security threats to critical infrastructures, which include the energy sectors. However, preparations at the national level were insufficient to cope with threats to a more complex, region-wide

energy network. Transnational risks to energy infrastructure, such as cyber security threats, require not just national-level coordination and intelligence-sharing among government agencies, industrial players and local communities, but also harmonisation of procedures in the form of a regional framework among ASEAN countries.

Regional cooperation against cyber threats, which would be instrumental for the protection of the Trans-ASEAN Energy Network, could provide a notable example of the lack of progress in collective CEIP efforts. In August 2002, ASEAN telecommunications ministers agreed to establish an ASEAN Network Security Coordination Council and to set up an early warning system to monitor 'cyber terrorism' in the region. However, nothing has been heard since regarding the establishment of a regional network security coordinating council, even though national-level computer emergency response teams (CERTs) do exist.

Similarly, the Brunei Action Plan adopted by ASEAN ministers for telecommunications and information technology on 19 September 2006 made no mention about establishing the Coordinating Council, although it did specify 'intensifying capacity building and training programmes for national CERTs' and 'strengthening the region's cyber-security network by expanding the ASEAN CERT Incident Drills to include ASEAN's Dialogue Partners in 2007'. Beyond these, however, the Brunei Action Plan focuses more on promoting region-wide societal access to information and communications technology (ICT). An institutional mechanism in the form of the Coordinating Council could have been a wise choice in harmonising cyber security policies, not merely restricted to national-level initiatives, which could benefit critical energy infrastructure. This is especially so since the ICT complexity of the common energy network would necessitate greater degrees of interstate, multi-sectoral coordination.

Conclusion

During the recent ASEAN Summit held in Thailand in late February 2009, ASEAN leaders noted the sound economic fundamentals of the region, and 'acknowledged that the scope for regional cooperation must be expanded to mobilise savings for investments in productive areas, particularly infrastructure development to spur regional growth'. This implies that regional energy initiatives, most importantly those specified under the APAEC 2004-2009, would most likely proceed. With energy price hikes likely during post-crisis recovery, such a move is certainly prudent to ensure energy security through the reduction of import dependence. However, the realisation of such goals could unfortunately open a Pandora's Box of new vulnerabilities for the Trans-ASEAN Energy Network in particular. In fact, the overland network could perhaps be more vulnerable in contrast to seaborne energy infrastructures such as offshore platforms and tanker shipping. Hence, there is a need to look beyond regional maritime security frameworks as the primary CEIP mechanism.

ASEAN has been very much focused on energy supply security and appears to pay less attention to CEIP, judging from the regional agreements reached to date. Active measures such as intelligence gathering against terrorist disruptions would not guarantee comprehensive CEIP since loopholes (which could be exploited by saboteurs) and uncontrolled causes (natural disasters) would always be present. Passive, reactive CEIP measures – hardening of physical and information systems – against man-made and natural threats remain highly essential. National-level CEIP measures are noteworthy, though not adequate for an increasingly energy-interdependent ASEAN tapping on a common energy network in the future. A more comprehensive regional CEIP framework could potentially fill the gaps.

Before the Trans-ASEAN Energy Network is fully realised, the following policy recommendations

could be proposed, post-APAEC 2004-2009:

1. Post-APAEC 2004-2009 re-evaluation of threats to energy infrastructure;
2. Formulation of a regional framework of standardised CEIP guidelines, regulations and procedures, including a common risk-mitigation strategy. It could facilitate regional policy coordination, though the framework provisions would have variations according to differing national contexts;
3. Establishment of a regional funding program which could help individual ASEAN member states finance national-level CEIP projects;
4. Allocation of resources to emergency response measures, such as the utilisation of distributed energy assets (including on-site, standalone and easily-deployable systems such as fuel cells) as a back-up supply system in the event of failure in the main energy grid system. These could be used in times of major national and regional emergencies such as a natural disasters, so that rescue and relief efforts as well as other essential services would not be hampered;
5. Continual focus on active, intelligence-led mitigation against man-made threats, such as through regional maritime security initiatives, given that the region would still remain dependent on foreign oil, at least in the near to medium term; and
6. A multi-sectoral, public-private partnership and governance approach for energy infrastructure security.

Working towards such goals could be financially and politically difficult, but not impossible. In fact, the diverse backgrounds of the ASEAN region substantiates the need to forge cooperation between states, leveraging on the varying competencies of individual nations to overcome conventional challenges faced by a single country. ASEAN has traditionally emphasised regional cooperation, culminating in the launch of the ASEAN Charter in December 2008.

Energy policies are typically formulated for normal, as opposed to emergency, conditions with little attention paid to the potential vulnerability of man-made and natural disruptions. The benefits of inserting redundancies and diversification into CEIP strategies were often overlooked or foregone due to either the priorities or the costs involved. These might be legitimate concerns, bearing in mind that only a few states, such as those in Southeast Asia, could afford redundancies and diversification measures in their CEIP plans. Furthermore, the security of energy supplies has always been a perennial concern for ASEAN countries. However, from another perspective, the costs of potential disruptions to the energy infrastructure could carry greater transnational ramifications both for policymakers and the average electricity consumer alike. Therefore, notwithstanding the current global economic slowdown, more attention should be paid to forging a comprehensive regional CEIP framework that could serve to ensure the long-term energy security of ASEAN.

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